idea of the great amount of matter which Dr. Lansdell has collected in these two volumes, so that we must content ourselves with a brief glance at a few of the more salient features.

To geographers the account of the Thian Shan Mountains will be among the subjects of interest. These mountains, estimated by Réclus as forming a mass twenty-five times larger than the Swiss Alps, and a protuberance on the earth's surface larger than the united mountains of all Europe, begin in Mongolia, and develope by the addition of successive ridges until they occupy from north to south above eight degrees of latitude. The heights of the several ranges vary from about 10,000 to 14,000 feet above the sea, and in the Pamir range exceed 15,000. The number of glaciers exceeds 8000. The principal lakes are the Alakul, the Balkash, and the Issikul, the waters of which are brackish; the first and second are believed to have once been connected. Volcanoes have been stated to exist in the Thian Shan, but this appears to be incorrect. Much information of interest is given about the Ili Valley, a meeting ground of the Tatar and Mongol races. From this region Dr. Lansdell diverged eastwards from the course of his journey to reach Kuldja, a town within the Chinese frontier, for some time in Russian occupation. He then continued his journey in a westerly direction, passing through Semirechia, of which region he gives many particulars of interest, dwelling especially on the patriarchal life of its nomad inhabitants. From the Kirghi Steppe he passed into Turkistan. The climate of portions of the Aralo-Caspian region does not appear inviting: the summer temperature is from 68° to 77° F., the winter from 5° to 23°. In the lowlands rain falls rarely in summer, and in only a small amount at any season. Hence there is a general desiccation. The beds of tributary rivers are dry; the main streams lose themselves in sands or terminate in brackish marshes; the smaller lakes have evaporated, leaving behind them beds of salt; the larger are much reduced in size. The land is barren; trees are scarce; vegetation is stunted, and limited in its species. The geology, as might be supposed, has not been exhaustively worked, but from a small work of M. Mouchketoff the author has obtained an outline, from which it appears that in one part or another of the district almost every formation, from the oldest to the newest, is represented, and that the mountain-chains consist largely of igneous rocks.

Dr. Lansdell spent some days in Bokhara, which town no English traveller had visited since the time of Wolff's adventurous journey. The fear of the Russian is, however, now upon this people, and he appears to have met with little difficulty, though subjected to some surveillance. On his way to the city he visited the Emir, then at Kitab, and had a gracious reception. The description of the author's invention of a court costume for the ceremony of presentation is amusing: the chief components were a cassock, a D.D. hood, some masonic jewels, and a square college cap. From Bokhara Dr. Lansdell travelled through Khiva, and thence by a rarely-traversed route, which, after following the general direction of the Abu-Daria for some distance, runs in a west-south-westerly direction to Krasnovodsk, near the Karaboghaz Bay of the Caspian. Thence he returned to England, having accomplished in 179 days a journey of 12,000 miles —laborious, with considerable hardships, and not without some danger, though the Russian influence has rendered many places, formerly all but inaccessible, comparatively safe.

Dr. Lansdell does not profess to be a scientific traveller, but he is a careful observer, noting with an experienced eye the physical peculiarities of the regions through which he travelled; and he has been at immense pains to gather together a large mass of information concerning the flora, fauna, and ethnology of Central Asia,[1] which has been to a great extent accumulated by Russian men of science, and which, from being written in their language, is practically inaccessible to most Europeans. The appendices on the flora and fauna of Russian Turkistan occupy 148 pages of rather small print, and there is in addition a very full bibliography of the same district which extends to twenty-five pages. But much information, both from books and from personal observation, is also incorporated into the narrative of travel. Dr. Lansdell's picture of the desiccation of the western part of Bokhara, of the moving sands between the Oxus and the Karakul, of the "barren and dry land" of the Aralo-Caspian region, and of the Karaboghaz Gulf—a great area of evaporation which, should any physical change close its narrow and shallow communication with the Caspian, would soon become one vast salt-pan—cannot fail to interest the student of physiography. In a word, the ethnologist, geologist, and naturalist will find these volumes not only very pleasant reading, but also most valuable for reference.

OUR BOOK SHELF

Bulletin of the Bussey Institution. Vol. II., 1884. (John Allyn, 30, Franklyn Street, Boston, U.S.)

THE *Bulletin* of the Bussey Institution has many claims to be considered as original in its design and in the character of its reports. It contains a large amount of information upon out-of-the-way topics, mostly treated upon from the chemical side, and in all cases communicated by Prof. F. H. Storer, Dean of the Institution, and Professor of Chemistry.

The Bussey Institution is apparently a branch of Harvard University, having special endowments, and its objects comprise the teaching of young men intended to become practical farmers, land agents, gardeners, florists, or landscape gardeners.

The investigations conducted by Prof. Storer, reported in the *Bulletin* before us, are highly interesting to such students, and are characterised by a keen practical bias. The first paper is devoted to results of analysis of the leaves of *Rumex crispus* and the common milk-weed (*Asclipias cornuti*), with a special view to their economic value. The second paper is upon an ingenious plan of ascertaining the rate at which various fertilisers may be scattered by hand, or, in the Professor's own language, "about how much of a given fertiliser would a man naturally throw from his hand in sowing an acre of land?" Surely no learned professor ever set himself a more homely task! Next we find "Experiments on Feeding Mice with Painters' Putty and with other Pigments and Oil." This is almost revolting, and raises a feeling of pity for the mice, together with a certain sense of loss of appetite on the part of the reader if he is indulging in an ante-prandial study of scientific novelties. Mice, however, *do* eat putty, and, more curious still, red lead

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[1] See an article by Dr. Lansdell, NATURE, May 21, p. 56.

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mixed with putty, without injury. They thrive on the linseed oil used in the manufacture of this most unsavoury side-dish and the whitening which forms the other ingredient of "pâté de putty" seems to neutralise the evil effects of the lead. The bearings of these facts are important from a sanitary point of view, as Prof. Storer shows that the effects of mice eating away the packing of valves, of drains, and closets is an immediate frustration of the best efforts of plumbers and sanitary engineers to keep human habitations free from sewer gas. Not content with mice, the Professor tried similar experiments upon rats, when it was found that "rats when kept upon a rather short allowance of oats, ate putty freely. Finally "the surviving rat was fed with 'plain putty' for a day or two, after which he received and ate (poor wretch) each day for two days a ball of putty made with a mixture of equal parts of slaked lime and whiting. He was next given a ball of putty made from a mixture of one part of oxide of zinc and three parts of whiting, together with $2\frac{1}{2}$ grammes of oats, and although he ate very little of the ball he died soon afterwards." The chief result of these experiments appears to be the injury rats and mice may do to houses and the curious protecting effect of whitening as an antidote to such active poisons as red and white lead and carbonate of baryta. Experiments upon the germination of weed seeds and a special instance of the resistance of clover seeds to water form two very interesting notes bearing directly upon well-known phenomena often ascribed by the ignorant to spontaneity of growth. The extraordinary irregularity of periods necessary for the germination of certain weed seeds is very clearly shown. "Of 400 seeds of shepherd's purse (*Capsella bursa pastoris*) three germinated on the fifth day and three on the seventh day, then none until the 145th day, when four germinated. Seven seeds germinated on the 1173rd day, or after an interval of about three years and two months—in all $18\frac{3}{4}$ per cent. to that date." Many similar cases are cited. Another article is upon "cherry stones eaten by domestic pigeons," which appears unpromising, but is rendered interesting by this versatile observer. Prof. Storer is evidently a man who is not likely to allow any natural phenomenon to pass unnoticed.

JOHN WRIGHTSON

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

Clifford's Common Sense of the Exact Sciences

IT does not seem to me necessary to reply to the charges made against Clifford by Prof. Tait in your issue of June 11—charges which, when freed from "mystery and insinuation," amount to accusations of plagiarism and inaccuracy—for Clifford's reputation is unlikely to be in any way affected by what Prof. Tait may write. But I do feel it necessary to make a remark on the last paragraph of his review. He therein accuses me of "mystery and insinuation," weapons which should not be employed in connection with Clifford's name. He does not do me the scant justice of publishing the footnote on which he passes these strictures. That footnote runs as follows:—

"A still more serious delay seems likely to attend the publication of the second part (*kinetic*) of Clifford's 'Elements of Dynamic,' the manuscript of which was left in a completed state. I venture to think the delay a calamity to the mathematical world."

When I wrote the footnote, I knew—

(1) That the manuscript was in existence, a fact with which any one who had examined the bibliography attached to the mathematical works must have been acquainted.

(2) That this manuscript, unlike that of the "exact sciences," had not at that time found a publisher, and therefore was more likely to be seriously delayed.

(3) That the mathematical world had been so far forgetful of its own interests as to raise no demand for its publication.

My note was written with the express purpose of recalling the attention of those who valued Clifford's work to the existence of this manuscript, in order that a general demand for its publication might produce a publisher. Those who find "mystery or insinuation" in this, or in whom this can "strike a jarring chord," must be singularly constituted individuals. The note had on the face of it an obvious purpose; that purpose, I am happy to know, it has to some extent helped to accomplish.

University College, June 12 K. P.

ON "K. P.'s" note, which has been communicated to me by the courtesy of the editor, I desire to make one or two remarks.

In writing my notice of Clifford's book I endeavoured to state clearly the impression which its perusal had produced in my own mind, and to say a few fitting words as to the special qualifications of the author. I must have sadly failed in this endeavour if in what I have written there can be found either mystery or insinuation, still more so if there can be found "accusations of plagiarism and inaccuracy." But of course even an Act of Parliament has to be construed after the letter, the declared intention of its framers notwithstanding. On reperusing my notice, however, I still think that it expresses what I meant to say, and that it cannot bear the construction put on it by "K. P."

The remarks I made on the foot-note to the Preface accurately described the impression which it produced on me, and which I am sure it is likely to produce on the majority of thoughtful readers. So strongly did I feel this impression that, when I finally returned my notice for press, I specially requested the editor to try to obtain for me an elucidation of the mystery. This has been—in part at least—supplied by Mr. Tucker's note.

Whether "R.," who writes in NATURE of this week, be really a "(so-called) metaphysician" or no, he certainly expresses himself in the language of that school; for he mildly characterises as "not sufficiently guarded" the statement that a figure, obtained in a certain way, will be a cube:—whereas it obviously may be any rectangular parallelopiped whose edges are commensurable. But I did not blame Clifford for having made this statement; I merely said that it "ought not to have escaped correction." Perhaps even that expression is too strong. I have lately learned by experience that over-zeal on the part of a press-reader may sometimes render abortive the most sedulous care on the part of an author. Over and over again I have had proof-sheets, marked "*press*," returned to me with a learned query at the phrase "feet per second, per second"; and in one or two instances the supposed blunder has been *rectified* after all in spite of me. P. G. TAIT

June 26

Recurrence of Markings on Jupiter

IN connection with my remarks on this subject (NATURE, xxxii., p. 31), and the suggestive coincidences which appear amongst certain drawings obtained in about the years 1857 and 1859, 1870 and 1872, and 1885, as to large elliptical markings in the southern hemisphere of Jupiter, I would further add that in about 1843 a remarkably large spot was visible, which may possibly be connected with the phenomena of more recent occurrence. Prof. Piazzi Smyth mentions in the *Observatory*, vol. iii., p. 450, that, in consulting some old observations preserved in the note-books of the Rev. H. C. Key, he found "a view of Jupiter, with not only the dark belts admirably drawn, but between them, in stronger black colour, a long oval spot. This spot, too, was so precisely the shape and size of the red spot which has of late been attracting the surprised attention of observers, that I could not but jump to the almost self-evident conclusion of their both referring to the same body, appearance, or phenomenon." The drawing alluded to was made on June 4, 1843, and Mr. Key described it as a "horizontal black spot in the light space between the two principal belts." In Chambers' "Descriptive Astronomy" (2nd ed., p. 107) it is stated, "In 1843 a very large black spot was observed by Mr. Dawes," and this object is doubtless identical with that figured by Mr. Key. It will be important to compare the observations and to learn whether these spots were situated in approximately the same latitude as the red spot of our own time.

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